CLEANING AND DEGREASING COMPOSITION

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Field of Search .................. 252/153, 158, 526, 527, 252/528, 529, 539, 171, DIG. 14, DIG. 7

References Cited

R  U.S. PATENT DOCUMENTS
3,882,038 5/1975 Clayton et al. ................. 252/164
3,910,855 10/1975 Abeles ....................... 252/527
3,960,742 6/1976 Leonardi ..................... 252/90
4,158,644 6/1979 Hammerel .................. 252/547

FOREIGN PATENT DOCUMENTS
1300699 6/1962 France

OTHER PUBLICATIONS

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Attorney, Agent, or Firm—Dority & Flint

ABSTRACT

A degreasing composition consisting essentially of 3–5% by weight of an ethylene glycol monoalkyl ether; 3–5% by weight of RCON(CnH2nOH)2, wherein R is alkyl of 8–18 carbon atoms and n is 2 or 3; 0.5–1.5% by weight of sodium metasilicate pentahydrate; 0.1–9.5% by weight of KOH; 1–3% by weight of R'CONH(CH2)nN+(CH3)2CH2COO-, wherein R' is alkyl of 8–18 carbon atoms; 3–5% by weight of R"-C6H4—SO3−H3N+R"', wherein R" is alkyl of 9–15 carbon atoms and R"' is alkyl of 2–4 carbon atoms; and water.

1 Claim, No Drawings
CLEANING AND DEGREASING COMPOSITION

BACKGROUND OF THE INVENTION

1. Field of Invention
   This invention relates to a water-based cleaning and
degreeing composition for automotive parts or other
objects contaminated with oil, diesel fuel or grease.

2. Prior Art
   Leonard has proposed, in U.S. Pat. No. 3,960,742, a
water-dispersible emulsion type cleaner for industrial
and household maintenance comprising a concentrate
of an ethylene glycol lower alkyl ether, an alkali hy-
droxide, a metalasicate, a nonionic amphotolyte and an
alkali salt of a lower alkylbenzene sulfonate.

Utvild has proposed, in U.S. Pat. No. 3,887,497, a
degreeing product containing an alkylbenzenesulfonic
acid detergent surfactant, a liquid organic solvent, an
alkaline builder and water.

Maunser et al. have proposed, in U.S. Pat. No.
3,709,838, a liquid detergent composition containing an
ethanolamine salt of an alkylarylsulfonic acid, an alkox-
ylated ether of a monohydric alcohol or alkyleneol and
a fatty acid alkanolamide. The compositions can be
diluted with water at the time of use, but are unstable
unless prepared under essentially anhydrous conditions.

Wixon has proposed, in U.S. Pat. No. 3,272,753, a
degreeing composition containing a mixture of aro-
sulfonate salts, sodium silicate, a fatty acid alkanolamide,
ethanol and water.

Other detergent compositions are disclosed by Trow-
bridge II (U.S. Pat. No. 2,704,280), Duff et al. (U.S. Pat.
No. 2,829,108), Sato et al. (U.S. Pat. No. 3,822,312) and
Flanagan (U.S. Pat. No. 4,203,872).

The foregoing references indicate that compositions
useful as medium and heavy duty degreasers contain
relatively large amounts of organic solvents, detergent
and builder in the aqueous medium employed.

There is therefore a need for medium and heavy duty
degreeing compositions which have lower concentra-
tions of organic solvent, detergent and builders than
heretofore and which are accordingly inflammable and
relatively safe to use.

OBJECT OF THE INVENTION

It is the object of this invention to provide a cleaning
composition, for medium- and heavy-duty degreeing
utility, which contains lower levels of organic solvent,
detergent and builder than heretofore and which is safer
to use than compositions previously available for this
purpose.

SUMMARY OF THE INVENTION

This invention relates to a degreeing composition
consisting essentially of 3–5% by weight of an ethylene
glycol monoalkyl ether; 3–5% by weight of RCONH(C2H5O)nH2O, wherein R is alkyl of 8–18 carbon
atoms and n is 2 or 3; 0.5–1.5% by weight of sodium
metasilicate pentahydrate; 0.1–0.5% by weight of KOH;
1–3% by weight of RCONH(C2H5O)nH+(CH2)nCH2COO−, wherein R′ is
alkyl of 8–18 carbon atoms; 3–5% by weight of R′-
C6H4SO3−H3N+R′′, wherein R′′ is alkyl of 9–15 car-
bon atoms and R′′′ is alkyl of 2–4 carbon atoms; and
water.

DETAILED DESCRIPTION

"Ethylene glycol monoalkyl ether," as used in the
specification and claims, is a compound of the formula
HOCH2CH2OCH2R′, wherein R′ is an alkyl of 2–20.
Preferred ethers are those wherein n′ is 1–6, that
is, the methyl, ethyl, propyl, butyl, pentyl and hexyl
ethers, including the various isomers. Most preferred is
ethylene glycol monobutyl ether, also known as butyl
Cellosolve.

The amount of ethylene glycol monoalkyl ether is
from 3–5% by weight, preferably 3.5–4.5% by weight.
Most preferably, the compositions will contain
4.0–4.25% by weight of the ethylene glycol monoalkyl
ether.

The ingredient represented by the formula
RCON(C2H5O)nH2O can also be called a fatty acid dialk-
olamide. When R is of 9–17 carbon atoms, the corre-
sponding fatty acid is of 10–18 carbon atoms, including
decanoic, capric, lauric, myristic, palmitic and stearic
acids. Mixtures are also useful. It is preferred to use a
coconut acid diethanolamide, the coconut acid being a
mixture of lauric, myristic, stearic and palmitic acids.

The dialkanolamide is obtained by reaction between
the fatty acid and a dialkanolamine, more particularly,
diethanolamine or disopropylamine. Amides derived
from diethanolamine are preferred.

The amount of fatty acid dialkanolamide in the
compositions of this invention is from 3–5% by weight,
preferably 3.5–4.5% by weight, most preferably
4.0–4.25% by weight.

The amount of sodium metasilicate pentahydrate
used in the compositions of this invention is 0.5–1.5%
by weight, preferably 0.75–1.0% by weight.

Potassium hydroxide can be used in the form of the
solid or an aqueous solution in preparing the composi-
tions of this invention. The amounts indicated in the
specification and claims will, unless otherwise indi-
cated, refer to solid KOH. The amount of KOH used
in the compositions of this invention is 0.1–0.5% by
weight, preferably 0.2–0.4% by weight, most preferably
0.2–0.3% by weight.

The ingredient represented by the formula
RCONH(C2H5O)nH+(CH2)nCH2COO− is also known as
a betaine and is derived from the same kinds of fatty
acids as the alkanolamides used in the practice of this
invention. Cocamidopropyl betaine is preferred.

Contemplated equivalents of the foregoing betaines
include the range of 271 to 412 grams.

The amount of betaine used in the compositions of
this invention is 1–3% by weight, preferably 1.5–2.5%
by weight, most preferably 1.75–2.0% by weight.

The ingredient represented by the formula
R′′′−C6H4SO3−H3N+R′′ is a derertive amine salt of an alkyl-
benzenesulfonic acid. The alkyl represented by R′′
can be straight or branched chain. However, detergent
alkylates are frequently made with propylene or butylene
oligomers and will have branched structures. Oligomers
obtained from ethylene will have an unbranched struc-
ture. It is preferred that R′′ in R′′′−C6H4SO3H is of 12
carbon atoms, whether as a pure compound or as a
mixture having an average of 12 carbon atoms.

Ethyl, propyl, isopropyl or any of the butyl amines
can be used to form the amine salt used as detergent.
The isopropylamine salt is preferred.
The amount of detergent amine salt of alkylbenzene-sulfonic acid used in the compositions of this invention is from 3–5% by weight, preferably 3.5–4.5% by weight, most preferably 4.0–4.25% by weight.

The compositions of this invention are made by adding the solutes to water, in any order, and stirring until a homogeneous product is obtained. It is preferred to use KOH in the form of a concentrated aqueous solution.

The compositions of this invention contain relatively small amounts of solute, when compared to known medium- and heavy-duty degreasers, and preferably contain at least 82% by weight of water.

The degreasing compositions are particularly useful for cleaning metal surfaces soiled with oil, diesel fuel or other petroleum-derived products. The compositions will therefore be used on automobile engines and in engine compartments and for cleaning heavy equipment or machinery. The compositions can be applied with a cloth or brush.

The product is safe to use, is effective for cleaning greasy surfaces, is odorless and presents no fire hazard.

### DESCRIPTION OF MOST PREFERRED EMBODIMENT

A most preferred composition is accordance with this invention will be one consisting essentially of 4.0–4.25% by weight of ethylene glycol monoalkyl ether, 4.0–4.25% by weight of RCON(C₆H₄OH)₂, 0.75–1.0% by weight of sodium metasilicate pentahydrate, 0.2–0.3% by weight of potassium hydroxide, 1.75–2.0% by weight of R'CONH(CH₂)₃N+(CH₃)₂CH₂COO⁻, 4.0%–4.25% by weight of R⁻C₆H₄SO₃⁻H₃N⁺R"⁻ and water, wherein the ethylene glycol monoalkyl ether is n-butoxyethanol, RCON(C₆H₄OH)₂ is a coconut diethanolamide, R'CONH(CH₂)₃N+(CH₃)₂CH₂COO⁻ is cocamidopropyl betaine and R⁻C₆H₄SO₃⁻H₃N⁺R"⁻ is an isopropylamine salt of dodecylbenzenesulfonic acid.

Without further elaboration, it is believed that one skilled in the art can, using the preceding description, utilize the present invention to its fullest extent.

The following preferred specific embodiments are, therefore, to be construed as merely illustrative and not limitative of the remainder of the disclosure in any way whatsoever. In the following Examples, unless otherwise indicated, all parts and percentages are by weight.

### EXAMPLE 1

A degreasing composition was made by adding to water (84.16% by weight) the following and stirring until a homogeneous product was obtained:

<table>
<thead>
<tr>
<th>% by weight</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>4.18</td>
<td>butyl Cellosolve</td>
</tr>
<tr>
<td>4.18</td>
<td>cocamido diethanolamine</td>
</tr>
<tr>
<td>0.84</td>
<td>sodium metasilicate pentahydrate</td>
</tr>
<tr>
<td>0.50</td>
<td>KOH (45% aqueous solution)</td>
</tr>
<tr>
<td>1.96</td>
<td>cocamidopropylbetaine</td>
</tr>
<tr>
<td>4.18</td>
<td>dodecylbenzenesulfonic acid, isopropylamine</td>
</tr>
</tbody>
</table>

The product was used to clean engines in an automotive repair shop.

### EXAMPLE 2

The following compositions are made as in Example 1:

<table>
<thead>
<tr>
<th>% by weight</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>4.0</td>
<td>2-propoxyethanol</td>
</tr>
<tr>
<td>4.5</td>
<td>cocamido diethanolamine</td>
</tr>
<tr>
<td>1.0</td>
<td>sodium metasilicate pentahydrate</td>
</tr>
<tr>
<td>0.25</td>
<td>KOH (solid)</td>
</tr>
<tr>
<td>2.0</td>
<td>myristylamidopropyl betaine</td>
</tr>
<tr>
<td>4.18</td>
<td>dodecylbenzenesulfonic acid, isopropylamine</td>
</tr>
<tr>
<td>0.84</td>
<td>sodium metasilicate pentahydrate</td>
</tr>
<tr>
<td>0.50</td>
<td>KOH (20% aqueous solution)</td>
</tr>
<tr>
<td>0.75</td>
<td>sodium silicate pentahydrate</td>
</tr>
<tr>
<td>1.75</td>
<td>cocamidopropyl betaine</td>
</tr>
<tr>
<td>4.18</td>
<td>dodecylbenzenesulfonic acid, ethylene salt</td>
</tr>
<tr>
<td>1.95</td>
<td>sodium metasilicate pentahydrate</td>
</tr>
<tr>
<td>0.50</td>
<td>KOH (40% aqueous solution)</td>
</tr>
<tr>
<td>4.25</td>
<td>cocamidopropyl betaine</td>
</tr>
<tr>
<td>0.75</td>
<td>sodium metasilicate pentahydrate</td>
</tr>
<tr>
<td>1.95</td>
<td>cocamidopropyl betaine</td>
</tr>
<tr>
<td>0.50</td>
<td>KOH (40% aqueous solution)</td>
</tr>
<tr>
<td>4.25</td>
<td>dodecylbenzenesulfonic acid, isobutylamine</td>
</tr>
</tbody>
</table>

The foregoing compositions are used to clean automotive engines, engine compartments and machinery soiled with oil, diesel fuel and the like.

The preceding examples can be repeated with similar success by substituting the generically or specifically described reactants and/or operating conditions of this invention for those used in the preceding examples.

From the foregoing description, one skilled in the art can easily ascertain the essential characteristics of this invention and, without departing from the spirit and scope thereof, can make various changes and modifications of the invention to adapt it to various usages and conditions.

What is claimed is:

1. A degreasing composition consisting essentially of 4.0–4.25% by weight of n-butoxyethanol, 4.0–4.25% by weight of a coconut diethanolamide, 0.75–1.0% by weight of sodium metasilicate pentahydrate, 0.2–0.3% by weight of potassium hydroxide, 1.75–2.0% by weight of cocamidopropyl betaine, 4.0–4.25% by weight of an isopropylamine salt of dodecylbenzenesulfonic acid and water.